PRELIMINARY NOTES ON A NEW AND DESTRUCTIVE OAT DISEASE.

By B. T. Galloway and E. A. Southworth.

During the months of May and June we received repeated complaints and inquiries concerning a mysterious oat disease which then threatened to destroy the entire crop of the eastern and central States.

During the month of May, when the oats were from 6 inches to a foot in height, the leaves suddenly began to turn brown and die at the tips. The lower leaves were attacked first and the brown color soon extended their entire length. In a very short time all the leaves were dead, or partially brown, and the prospects were that the plants would die and the oat crop be a total failure. About the middle of June, however, the fields began to revive, the oats put out some few fresh green leaves, most of them headed out, and by the first of July many of the fields appeared in a fair condition on superficial observation. In reality, however, the losses from the disease will amount to from 35 to 75 per cent. of the crop, according to the locality. Very discouraging losses are reported from the State of Pennsylvania, where there is probably not a healthy oat field to be found. Kentucky and Tennessee have suffered even more, their present averages as reported to the Statistical Division being the lowest ever reported from any State for a staple crop.

The disease extends from New England to Georgia, and from the Atlantic coast as far west as Indiana and Illinois. It is not present in Michigan. All the agents for the Statistical Division agree in ascribing the cause of this remarkable decline in the oat crop to the same thing, namely, a "blight" or "rust" which struck the fields in May.

The disease prevented the oats from stooling well, and it frequently happened that all the shoots but the main one of a stool were killed. As a result the oats are very thin, and in riding along by a field even at a considerable distance one can see to the ground between the drill rows when the oats are in full head. Besides this the losses are augmented by the fact that the amount of green foliage which developed after the attack was not sufficient to produce a strong growth of the surviving stalks, nor to supply material for a good-sized head; the straw is therefore short and light and the heads small. The heads do not seem to be well filled, and threshing will probably reveal a lighter yield than farmers themselves expect.

Such a universal disease can be attributed to no deterioration of soil or lack of cultivation, although there is no doubt that good cultivation will produce better oats than poor, even when they are diseased. The disease has attacked oats on the best as well as on the poorest soils, fields that were fertilized as well as those that were not. The oats are best, however, in level well cultivated and well drained fields, while they are poorest in low, wet spots and on hillsides and other

places where the soil is thin. In such places they are too short to be harvested.

A very careful study of the plants has been made in the field and laboratory, but nothing in the way of a fungous or animal parasite that could cause the trouble has been found. From the nature of the disease our attention has been directed mainly to a study of it from a bacterial standpoint. Bacteria have been found in every specimen examined. Nearly 200 cultures have been made in at least a dozen different media and all have yielded two germs, one of which is exceedingly abundant. In nearly 50 cases the disease has been produced in young pot-grown plants by inoculating from direct material. Inoculations of young plants with pure cultures are now under way and it is hoped that some definite results will soon be obtained from this source.*

There is still a possibility that although the disease may be caused by bacteria they are dependent upon certain conditions of the atmosphere for their development, and need not be feared another year. Experiments to settle this question are also under way.

COPPER-SODA AND COPPER-GYPSUM AS REMEDIES FOR GRAPE MILDEW.

BY J. NESSLER.

(Translated from Biedermann's Centrall-Blatt for April, 1890, by Gerald McCarthy, N. C. Experiment Station.)

For several years preparations of copper-soda and copper-lime have been employed for mildew of the grape with good success. Neither of these preparations do any injury to the sensitive parts of the vine. The copper-soda mixture neither clogs the openings of the sprayer nor interrupts the spray by foaming; moreover, it sticks to the leaves very well. With this mixture the granular deposit is formed less rapidly the first day, but after that more rapidly than is the case with the copper-lime mixture. Sulphate of copper is decomposed equally well by soda and by lime. The granular deposit takes place sooner or later, according to the method of preparing the mixtures. Once formed, the pulverulent mass returns to its former state very quickly after being stirred, and on this account it is liable to clog the opening of the sprayer. More particularly is this the case when the lime used is not very finely divided or the copper solution is not sufficiently diluted. One should therefore use in mixing only a perfectly homogeneous lumpless lime-cream and copper solution so dilute that little or no additional water

* Since writing this the disease has been produced in fifty or more cases by inoculating with the more abundant organism. Five days after inoculating, the characteristic discolorations appeared, and cultures made from these have yielded the typical organism in a nearly pure condition.